

I CLAIM:

1. A method of treating coal combustion flue gas containing mercury, comprising: injecting one of molecular halogen and a thermolabile molecular
5 halogen precursor into said flue gas to effect oxidation of elemental mercury to a mercuric halide and providing one of a liquid and alkaline solid particles in said flue gas in order to adsorb at least a portion of said mercuric halide.
2. The method as claimed in claim 1, wherein said molecular halogen and/or
10 thermolabile molecular halogen precursor contains one of chlorine, bromine and iodine.
3. The method as claimed in claim 2, wherein said thermolabile molecular
15 halogen precursor contains a hypohalite.
4. The method as claimed in claim 3, wherein said hypohalite is a
hypochlorite.
5. The method as claimed in claim 4, wherein said hypochlorite is calcium
20 hypochlorite.
6. The method as claimed in claim 5, wherein the calcium hypochlorite is in
aqueous solution.
- 25 7. The method as claimed in claim 6, wherein calcium chloride is a
component of the calcium hypochlorite containing solution.
8. A method as claimed in claim 1, wherein the alkaline solid particles are
alkaline coal fly ash particles.

9. A method as claimed in claim 8, wherein the coal fly ash particles are those derived from combustion of subbituminous or lignite coal.
10. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from the fusion of coal ash with alkali and an alkali flux.
11. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from the decomposition of a thermolabile halogen precursor.
12. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from flue gas desulphurization solids.
13. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through an electrostatic precipitator.
14. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through a baghouse.
15. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through a fabric filter.
16. The method as claimed in claim 1, wherein the resulting treated flue gas is passed through a flue gas desulphurization system (FGD) containing a liquid..
17. The method as claimed in claim 11, wherein the alkaline particles contain lime.
18. The method as claimed in claim 1, wherein the mercuric halide containing alkaline solids is used as a cementitious product.

2017-03-03 14:00:00

REFERENCES

1. www.epa.gov/region2/health/mercury.htm
- 5 2. www.netl.doe.gov/publications/press/2001/tl_mercurysel2.html
3. Ide, Akiro et al. 1988. "Process for Cleaning Mercury-Containing Gaseous Emissions". United States patent 4,729,882. March 8.
- 10 4. Felsvang, K et al. 1995. "Method for Improving the Hg-Removing Capability of a Flue Gas Cleaning Process". United States patent 5,435,980. July 25.
5. Meischen, S. and J. Van Pelt. 2000. "Method to Control Mercury Emissions from Exhaust Gases". United States patent 6,136, 281. October 24.
- 15 6. Biswas, P. and C. Wu. 2001. "Process for the Enhanced Capture of Heavy Metal Emissions". United States patent 6,248,217. June 19.
7. Amrhein, Gerald T. 2001. "Mercury Removal in Utility Wet Scrubber Using a Chelating Agent". United States patent 6,328,939. December 11.
- 20 8. Galbreath, Kevin C. and Christopher Zygarlicke. 2000. "Mercury Transformations in Coal Combustion Flue Gas". Fuel Processing Technology. 65-66. pages 289-310.
- 25 9. Oehr, Klaus H. and Felix Z. Yao. 2001. "Method and Product for Improved Fossil Fuel Combustion". United States patent 6,250,235. June 26.
- 30 10. Mendelsohn, M.H. 1999. "Method for the Removal of Elemental Mercury from a Gas Stream". United States patent 5,900,042. May 4.

2004T20" 986E200T

11. Singer, Joseph G editor. 1991. Combustion Fossil Power. Combustion Engineering, Inc. Windsor, Connecticut.
- 5 12. Dean, John A. 1992. Lange's Handbook of Chemistry. McGraw-Hill, Inc. (New York)
13. The Merck Index. 1996. Twelfth Edition. Merck & Co. (New Jersey)
- 10 14. Urano, Saburo. 1928. "Studies on Bleaching Powder, VII. The Decomposition of Calcium Hypochlorite by Heat in the Presence of Calcium Chloride". Journal of the Society of Chemical Industry of Japan. Volume 31, pages 46-52.
- 15 15. Chase, M.W. et al. 1985. "JANAF Thermochemical Tables", Third Edition, Parts I and II, Journal of Physical and Chemical Reference Data, American Chemical Society and the American Institute of Physics for the National Bureau of Standards, Volume 14, Supplements I and II.
- 20 16. Senior, C.I. et al. 2000. "Gas-Phase Transformations of Mercury in Coal-Fired Power Plants". Fuel Processing Technology. 63:197-213.